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| 10/673,203      | 09/30/2003  | Hermann Kuhlmann     | 08500001BA          | 9611             |

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WHITHAM, CURTIS & CHRISTOFFERSON & COOK, P.C.  
11491 SUNSET HILLS ROAD  
SUITE 340  
RESTON, VA 20190

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| EXAMINER |
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THEXTON, MATTHEW

|          |              |
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| ART UNIT | PAPER NUMBER |
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1714

DATE MAILED: 09/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/673,203

Applicant(s)

KUHLMANN ET AL.

Examiner

Matthew A. Thexton

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-15 and 18-28 is/are pending in the application.
- 4a) Of the above claim(s) 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-15, 18-21 and 23-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 09/509,743.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date one sheet.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Group I, claims 9-15, 18-21 and 23-28, in the reply filed on 2006 July 26 is acknowledged.

### ***Information Disclosure Statement***

The IDS submitted 2004 August 19 has(have) been considered.

The foreign language documents submitted without English language abstracts have been lined through.

The foreign patent documents and non-patent literature documents cited were not submitted. However, they were located in the parent file and the non-patent literature documents have been concurrently cited on form PTO-892 so that they will be scanned and available in image form in the electronic file record.

### ***Specification***

The disclosure is objected to because of the following informalities:

The quality of some sections of the specification is so poor that it is probable that in the event this case goes to allowance the Office of Publications will have difficulty interpreting the subject matter without introducing errors. Applicant is requested to replace the following paragraphs: Page 1, beginning at line 22; page 3, beginning at line 28; page 5, beginning at line 20; page 6, beginning at line 18; page 7, beginning at

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line 19; page 9, beginning at line 21; page 11, beginning at line 19; page 12, beginning at line 20; page 13, beginning at line 17.

The claim for benefit at the first line of the specification requires updating for both the US and PCT documents which have been published.

At page 7, line 9 "in solution" lacks a closing quotation mark.

At page 11, a section heading for the brief description of drawings is lacking.

The title is objected to as not accurately reflecting the presented claims.

The abstract is objected to because: "Li" is apparently mistyped; and "denotes" is misspelled twice.

Appropriate correction is required.

### ***Claims Version***

The listing of claims submitted in the paper filed 2006 July 26 has been examined.

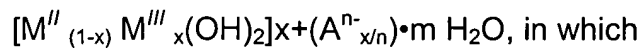
### ***Claims Analysis***

Claims 1-8, 16, and 17 are canceled.

Claim 22 is withdrawn.

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Independent claim 9 is directed to layered double hydroxide (LDH) comprising exchangeably bound anions in intermediate layers and which can be represented by the formula:



- $M^{II}$ , is a divalent Ca, Mg, Fe, Ni, Zn, Co, Cu, Mn metal ion, or 2 Li [ions],
- $M^{III}$ , is a trivalent Al, Fe, Cr, or Mn metal ion,
- $A^{n-}$ , is a n-valent nitrate, sulfate, chloride or hydroxide anion in the

intermediate layer.

The “exchangeably bound anions” cannot be carbonate, but this does not mean that carbonate cannot be present.

Claims 10-14 and 18 depend directly or indirectly from claim 9 and specify or further limit: the amount of nitrate anion; the further presence of “auxiliary materials and additives;” the further presence of “ordinary mixed fertilizer and optionally other fertilizer additives;” the further presence of “seeds, seedlings, or propagation material;” that such are coated with the LDH and optionally with other additives; and the type of divalent metal ion and the LDH is “essentially carbonate-free.”

Independent claim 20 is directed to layered double hydroxide (LDH) comprising:

- at least one intermediate layer;
- $M^{II}$ , a divalent metal ion or 2 Li [ions], surrounded by  $OH^-$ ;
- $M^{III}$ , a trivalent metal ion, producing an excess of positive charge; and

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- $A^{n-}$ , anions in the intermediate layer which balances the excess of positive charge due to the  $M^{III}$ .

This claim encompasses carbonate anions, either exclusively or in part, as well as organic anions.

Claims 21 and 23-28 depend directly or indirectly from claim 20 and specify or further limit: the LDH is “essentially carbonate-free” and the type of divalent metal, trivalent metal, and anion; the LDH contain “anions exchangeably bound in intermediate layers” [which does not encompass carbonates, per page 4, lines 9-12 of specification]; the type of divalent metal, trivalent metal, and anion; and the type of anion.

Claim 15 reads: “A preparation wherein the LDH is present in liquid form or in solid form.” This claim is so unclear that examination on the merits is precluded.

Claim 19 depends from claim 15 and recites the solid form is a granulate, a powder or a prill. This claim is so unclear that examination on the merits is precluded.

### ***Claim Objections***

Claims 9 and 20 are objected to because of the following informalities: “2 Li” should be either “2 Li<sup>+</sup>” or “2 Li ions” to be contextually correct. Appropriate correction is required.

Claim 20 is objected to because of the following informalities: Line 3 refers to “bivalent” while line 6 refers to “divalent.”

Claims 9, 18, 20, and 21 are objected to under 37 CFR 1.75(i) as being in improper form because each of a plurality of elements or steps of the claim should be separated by a line indentation. See MPEP § 608.01(m).

Claim 24 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 18. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). The only apparent difference between these claims is “essentially carbonate-free” versus “substantially carbonate-free.”

***Claim(s) Rejection(s)- 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The term “substantially carbonate-free” does not have basis in the application as originally filed.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-15, 18-21, and 23-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 9 and 20 recite "2 Li" which is inconsistent with the group of divalent metal ions; apparently the claim limitation should be either "2 Li+" or "2 Li ions" to be contextually correct.

Claim 15 recites the limitation "the LDH" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 20 recites the limitation "the bivalent metal ions" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 20 employs "bivalent" and "divalent" apparently to describe the same metal ions. This is confusing.

### ***35 USC § 102 and 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting

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directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

### ***Claim(s) Rejection(s)***

1. Claims 9-11, 18, 20, 21, and 23-28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hansen et al., "The Use of Glycerol Intercalates in the Exchange of  $\text{CO}_3^{2-}$  with  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$  or  $\text{Cl}^-$  in Pyroaurite-Type Compounds".

The present claims are broadly discussed hereinabove in the section ***Claims Analysis*** which is incorporated by reference.

See abstract, which discloses the carbonates can be relatively easily exchanged by  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$  or  $\text{Cl}^-$  thus introducing same to the "interlayer region." Thus claims 9, 10, 20, 23, and 25-28 are anticipated.

In the event the reference is deemed to be of not sufficient specificity to sustain a conclusion of anticipation, then it is concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to have made LDHs following the plain suggestion to do so and further to have combined LDHs with "auxiliary materials and additives" when used as anion exchange materials as suggested.

2. Claims 9-11, 18, 20, 21, 23, 24, and 26 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by GB 1336864.

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The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

See page 1, lines 14-19, 29, and 65 (for sulfate anion) and page 10, lines 8-14 (meets claim 11).

3. Claims 9, 10, 18, 20, 21, 23, 24, 26, and 28 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by meixnerite as described in Martin et al. (US 5514361A).

The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

In the case where A is hydroxide, the claimed LDH is simplified to meixnerite, as disclosed in '361 (column 1, lines 27-30, et al.).

4. Claims 9-11, 18, 20, 21, and 23-28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Martin et al. (US 5728363A).

The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

In the case where A is hydroxide, the claimed LDH is simplified to meixnerite, as disclosed in '363 (column 4, lines 37-39). Other substituted anions suggested are chloride, nitrate, and sulfate (column 3, lines 50-51).

In the event the reference is deemed to be of not sufficient specificity to sustain a conclusion of anticipation, then it is concluded that it would have been obvious to one of

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ordinary skill in the art at the time of the invention to have made LDHs following the plain suggestion to do so and further to have combined LDHs with “auxiliary materials and additives” when used as suggested (column 5, lines 6-12).

5. Claims 9-11, 18, 20, 21, and 23-28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Clark et al. (US 4773936).

The present claims are broadly discussed hereinabove in the section ***Claims Analysis*** which is incorporated by reference.

Anion exchange material is disclosed (column 2, line 63 to column 3, line 37) and exemplified with chloride anion (examples 1, 2, 20, 21 and dye “additive” (as required by claim 11)). Specifically listed anions are nitrate, sulfate, and hydroxide (column 6, lines 47-59) and mixtures thereof (ibid and column 7, lines 9-21).

In the event the reference is deemed to be of not sufficient specificity to sustain a conclusion of anticipation, then it is concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to have made LDHs following the plain suggestion to do so with nitrate, sulfate, hydroxide, and mixtures thereof.

6. Claims 9, 10, 18, 20, 21, 23, 24, 26, and 28 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Narita et al. (JP 5-317603A, as evidenced by USPTO obtained translation).

The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

'603 discloses LDHs comprising hydroxide and fluoride anions (paragraph 0005) are known. Further, the sulfate ion made be similarly adsorbed (paragraph 0007). Exchangeability is inherent to the materials.

7. Claims 9-11, 18, 20, 21, and 23-28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Diblitz et al. (WO 96/23727A1, as evidenced by Noweck et al. US 6180764B1).

The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

Reference '764 will be relied upon since it is in English. Anion exchange material is disclosed (column 2, line 60 to column 3, line 2) and exemplified with hydroxide and nitrate anions (examples 1, 9, and 15). Uses suggested are incorporation with other materials (column 5, lines 5-9) (as required by claim 11). Specifically listed anions are nitrate, chloride, sulfate, and hydroxide (column 4, lines 14-27).

In the event the reference is deemed to be of not sufficient specificity to sustain a conclusion of anticipation, then it is concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to have made LDHs following the plain suggestion to do so with chloride and sulfate and to have incorporated "additives."

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8. Claims 9, 10, 18, 20, 21, and 23-28 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nosu et al. (US 5750609A).

The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

Anion exchange material is disclosed (column 3, lines 48-55) and exemplified with nitrate anion (example 6). Specifically listed anions are nitrate, sulfate, chloride, and hydroxide.

In the event the reference is deemed to be of not sufficient specificity to sustain a conclusion of anticipation, then it is concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to have made LDHs following the plain suggestion to do so with chloride, sulfate, and hydroxide.

9. Claims 9, 10, 18, 20, 21, 23-26, and 28 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Pinnavaia et al. (US 5079203A).

The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

See column 9, lines 32-49 and examples 1-6.

10. Claims 9-11, 18, 20, 21, and 23-28 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Suzuki et al. (US 5976401A).

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The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

Anion exchange material is disclosed (column 4, lines 17-68) and exemplified with hydroxyl and chloride anion and "auxiliary materials and additives" (example 1, 6, 12). Specifically listed anions are nitrate, sulfate, chloride, and hydroxyl.

In the event the reference is deemed to be of not sufficient specificity to sustain a conclusion of anticipation, then it is concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to have made LDHs following the plain suggestion to do so with nitrate and/or sulfate.

Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over rejections numbered 1, 4, 5, and 7-10 as applied to claim 9 above, and further in view of Henning (IP 326110A1, as evidenced by Derwent abstract ACC-NO: 1989-222074; a translation of this document has been requested and will be forwarded when available) and Heller et al. (US 4396412) and Ryan et al. (US 4753035).

The present claims are broadly discussed hereinabove in the section **Claims Analysis** which is incorporated by reference.

The primary references are discussed in the rejections of claim 9 hereinabove.

'110 discloses the use of clay having nutrients exchangeably incorporated into its intermediate layers. Since nitrate is notoriously well known as a fertilizer, it is concluded that it would have been obvious to one of ordinary skill in the art at the time of the

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invention to have employed the LDHs having nitrate exchangeably present in the material as fertilizer.

'412 discloses the use of anion exchange polymers to supply nutrients, such as nitrate (column 4, lines 15-17), alone or in combination with other fertilizers or plant additives, to soil, the plants or as top dressing (column 6, lines 30-45). It would have been obvious to one of ordinary skill in the art at the time of the invention in view of the disclosures of exchangeable nitrate LDHs to have employed them in the manner disclosed in '412.

'035 discloses coating compositions for seed and seedlings which may contain fertilizer (column 5, lines 25-32). It would have been obvious to one of ordinary skill in the art at the time of the invention in view of the disclosures of exchangeable nitrate LDHs and the knowledge that nitrates are fertilizers, to have employed them in the manner disclosed in '035.

### ***Citation of Pertinent Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Clark et al. (US 4840676) examples 4, 8, and 12, appears to be cumulative to Clark et al. (US 4773936).

Clark et al. (US 4769080), appears to be cumulative to Clark et al. (US 4773936), because none of Applicant's claims require the lithium ion disclosed in '080.



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Okada et al. (US 5980856A), available under 35 USC 102(e) unless Applicant perfects foreign priority benefit, specifically at column 1, line 48 to column 2, line 34 and examples 1-7, appears to be cumulative to references applied hereinabove, because none of Applicant's claims require the lithium ion disclosed in '856.

Okada et al. (US 5861133A), available under 35 USC 102(e), specifically examples 1-13, appears to be cumulative to references applied hereinabove.

Arena et al. (US 5232887A), specifically column 4, lines 10-40, appears to be cumulative to references applied hereinabove.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew A. Thexton whose telephone number is 571-272-1125. The examiner can normally be reached on Tuesday-Friday, 10:00-7:30:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasudevan S. Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Matthew A. Thexton  
Primary Examiner  
Art Unit 1714  
[matthew.thexton@uspto.gov](mailto:matthew.thexton@uspto.gov)